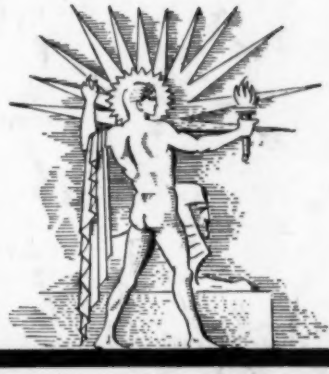
TECHNOLOGY DEPT
PRICE
15¢

SCIENCE NEWS LETTER

PUBLIC LIBRARY
MAR 11 1941
DETROIT

THE WEEKLY SUMMARY OF CURRENT SCIENCE



March 8, 1941

For Heat and Cold

See Page 152

A SCIENCE SERVICE PUBLICATION

Do You Know?

Oiled silk "raincoats" with zippers are new for *books*.

One of Palestine's newer industrial plants makes *buttons* from camel bone.

German chemists have evolved a rice-like new *food*, mainly made of potatoes and whey.

Germany for a number of years has over-cut its *forests* by 50%, says an American forester.

England expects to start using quantity supplies of *bread enriched* with synthetic vitamin B_1 by May.

Says the American Wildlife Institute: *Snapping turtles* have been known to bite completely through the blade of an oar.

Butterfat production is improved when cows are milked by a timing device that rings at the end of four or five minute periods, experiments in New York State show.

Brownish color on used *tin pans* is tin oxide, home economists explain, and this is a better conductor of heat than tin itself, all of which explains in part why cakes brown better on the bottom in old tin pans than in new ones.

Investigating the digestion of an *alligator*, a scientist reported finding these in an alligator stomach: 11 heavy brass rings, a glass bead necklace, 18 stones in assorted sizes, several porcupine quills, black cord, and assorted bones.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

ASTRONOMY

When can you next see "blood on the moon"? p. 150.

CHEMISTRY

A germ provides a test for the presence of what vitamin? p. 153.

How are soy beans used in automobile upholstery? p. 148.

ENGINEERING

How can dredges walk to work? p. 153.

HORTICULTURE

What are the advantages of a new patented mango? p. 153.

INVENTION

How can radio "fingers" pick up a night flying airplane? p. 147.

MEDICINE

Why are blood transfusions sometimes given through the bones? p. 151.

ORNITHOLOGY

What kind of bird invariably has twins? p. 153.

PHOTOGRAPHY-AERONAUTICS

How are aerial photographs finished in seven minutes? p. 148.

PHYSICS-RADIO

What particles from the sun are "perhaps of the structure of a string of pearls"? p. 158.

POPULATION

Why is China troubled by a labor shortage? p. 150.

PSYCHOLOGY-PHYSIOLOGY

What would be the advantage in spinning student pilots? p. 157.

Why is the Londoner's bread a protection against jittery nerves? p. 149.

RADIO

How is television in color made possible? p. 154.

WILDLIFE

Why are wildlife administrators worried about crop surpluses? p. 151.

ZOOLOGY

What rare baby is being guarded on "monkey island"? p. 147.

Purple *inspection stamps* on meat are a harmless vegetable coloring which need not be cut off before cooking.

Milk in summer may contain twice as much *vitamin D* potency as winter milk, says a British nutritionist.

A Canada *goose* with a broken leg treated itself by straightening the leg with its beak, and using its wings as crutches in hopping until the leg healed.

On a building site cleared in London and left for about two years, a botanist found growing 28 flowering *plants* and ferns, as well as mosses and liverworts.

Scientists in Moscow report their intention of building a 50-million volt *cyclotron*.

The United States is now having a farm-to-suburb *migration*, replacing the older trend of moving from farm to city.

Gelatin manufacturers say that glue may contain gelatin, but gelatin never contains glue: they are made by different processes.

Dental decay has a seasonal trend, judging by studies of school children which showed new cavities most numerous in late winter and spring.

SCIENCE NEWS LETTER

Vol. 39 MARCH 8, 1941 *No. 10*

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 2101 Constitution Avenue, Washington, D. C. Edited by WATSON DAVIS.

Subscriptions—$5.00 a year; two years, $7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

In requesting change of address, please give your old address as well as the new one, at least two weeks before change is to become effective.

Copyright, 1941, by Science Service, Inc. Republication of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service.

Cable address: Scienserve, Washington.

Entered as second class matter at the postoffice at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

Members of the American Association for the Advancement of Science have privilege of subscribing to SCIENCE NEWS LETTER at $3 a year.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Advertising rates on application. Member Audit Bureau of Circulation.

SCIENCE SERVICE is the Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: Henry B. Ward, University of Illinois; Edwin G. Conklin, American Philosophical Society; J. McKeen Cattell, Editor, Science. ***Nominated by the National Academy of Sciences:*** R. A. Millikan, California Institute of Technology; Harlow Shapley, Harvard College Observatory; William H. Howell, Johns Hopkins University. ***Nominated by the National Research Council:*** Ross G. Harrison, Yale University; C. G. Abbot, Secretary, Smithsonian Institution; Harrison E. Howe, Editor, Industrial and Engineering Chemistry. ***Nominated by the Journalistic Profession:*** O. W. Riegel, Washington and Lee School of Journalism; A. H. Kirchhofer, Buffalo Evening News; Neil H. Swanson, Baltimore Evening Sun. ***Nominated by the E. W. Scripps Estate:*** Karl Bickel, E. W. Scripps Co.; Warren S. Thompson, Miami University, Oxford, Ohio; Harry L. Smithton, Cincinnati, Ohio.

Officers—Honorary President: William E. Ritter. ***President:*** Edwin G. Conklin. ***Vice-President and Chairman of Executive Committee:*** Harlow Shapley. ***Treasurer:*** O. W. Riegel. ***Secretary:*** Watson Davis.

Staff—Director: Watson Davis. ***Writers:*** Frank Thone, Emily C. Davis, Jane Stafford, Marjorie Van de Water, James Stokley. ***Photography:*** Fremont Davis. ***Librarian:*** Minna Gill. ***Sales and Advertising:*** Hallie Jenkins, Austin Winant. **Correspondents in principal cities and centers of research.**

INVENTION

Invention for Detecting Airplanes at Night

Can Be Used on Plane to Avoid Collision With Another Or on Ground for Gunfire Control; Works by Radio

RADIO waves about 20 inches long form the fingers which detect invisible airplanes at night, according to a new invention just granted patent 2,231,929 by the U. S. Patent Office. This patent went to Joseph Lyman, of Huntington, N. Y., who assigned it to the Sperry Gyroscope Co., Inc., of Brooklyn.

Repeatedly reports have come from England that R.A.F. fighter planes have some new equipment enabling them to detect Nazi bombing planes in full darkness. The exact nature of the device has not been revealed but, judging by Mr. Lyman's description of his invention, it might serve the purpose.

"The novel indicator," he states in the specifications, "is adapted for use on aircraft either for indicating the direction of approach of other aircraft, to thereby prevent collision under conditions of poor or zero visibility, or for use on the ground as when locating aircraft for purposes of gunfire control, or for controlling aircraft landings from the ground, and for other purposes."

He suggests the use of signals of 600 megacycles, or about 20 inches wavelength, because these can be generated and detected by simple means, and are not greatly interfered with by natural phenomena, such as solar radiation. These are about a hundredth of the wave-length of the 6 megacycle signals used for transatlantic short wave broadcasts.

The apparatus consists of a receiving antenna in a parabolic reflector which sweeps around several hundred times a second. At the same time, the axis of rotation itself turns, but more slowly, so that the antenna sweeps all the way around. Because of the reflector it will only receive signals originating in the direction to which it is pointed. Instead of one such antenna, two can be used, one sweeping vertically, the other horizontally.

In peace time, the approaching airplane might have its own transmitter and send out a continuous warning. Since enemy bombers would hardly be so obliging, however, it can also operate with a transmitter on the defending plane, since the other would reflect the waves from its metal shell. In either event, the receivers pick up the signal only at one instant in their sweep, and this is shown by a spot of light on the end of a cathode ray tube, like that used in television receivers. The position of the spot shows the exact direction of the other plane.

For fire control from the ground, where more bulky equipment may be employed, parabolic transmitting antennas are also used, which turn in step with those of the receiver. This is more efficient, because the signals are sent only in the direction where they will be detected, not broadcast.

Science News Letter, March 8, 1941

ZOOLOGY

Baby Gibbon Jealously Kept From Human Sight

ONE of the rarest babies ever born beneath the Stars and Stripes, an infant gibbon that first saw the light on Jan. 31, on the famous "monkey island" off the coast of Puerto Rico, is still the most jealously guarded. Its ape parents have thus far permitted only one person to see it—a gentle, slow-moving, easy-going Puerto Rican keeper named Juan Ramos. They hide it from every other human, stated Michael Tomilin, superintendent of the great simian colony, who is at present a visitor in New York at the College of Physicians and Surgeons, Columbia University.

So far as Mr. Tomilin's records show, only four gibbon babies have ever been born on American soil. Two of these died very young; the only other one known to be alive at present is in the Philadelphia Zoo. (*Turn to next page*)

AIRPLANE CREATION

This is the loft in the engineering department of the new Vega Airplane Company plant in California. Air conditioning, fluorescent lighting, and many other modern conveniences help to speed the defense program here.

There are at present 13 adult gibbons on Santiago Island, where the monkey colony is located. They were all brought there from Thailand as immature, newly captured specimens in December, 1938. Three matings have occurred, of which the new baby is the first product.

Gibbons, Mr. Tomilin explained, are much more difficult to deal with than are the rhesus monkeys that constitute the bulk of the island's population — some 400 animals. The long-armed apes do not have such inoffensive manners as the good-natured monkeys, but are given to slipping up behind their keepers and biting them when opportunity offers. Hence they are not given the liberty of the place like the monkeys but are kept in cages.

Science News Letter, March 8, 1941

PHOTOGRAPHY—AERONAUTICS

Aerial Photographs Now Developed and Printed Aloft

Film, in Holders Not Affected by Developer, Plunged Into Tanks for Finishing; Prints Ready in 7 Minutes

AERIAL photographs, taken and printed in the air within seven minutes after exposure, are among the latest accomplishments of U. S. Army Air Corps technicians at Wright Field, Dayton, Ohio.

By making the pictures so rapidly, then dropping them to the ground in a metal container to which a streamer is attached to make it easy to find, information gained on flights over enemy territory can be quickly delivered to headquarters. Hitherto, the general practice has been for the plane to land with the undeveloped films, which were then finished.

According to H. F. Stiffler, Wright Field mechanical engineer, who describes the new system in an Air Corps publication, the advantage of such a system has long been realized, but earlier attempts were held back, chiefly through lack of interest, and also because of the danger to airplane structure and controls caused by corrosion from the photographic chemicals.

In 1939, he says, the photographic laboratory at Wright Field experimented with a quick-work unit, that made pictures on reversal-type paper instead of film. In the developing process, a positive print could be obtained without the intermediate stage of a negative.

Disadvantage of the method was that the paper is much slower than aerial film, so exposures could be made only under fairly good lighting conditions. In addition, its processing requires close regulation of the temperature of the solutions. This made necessary tanks with automatic cooling and heating.

High speed film is now used, with processing solutions that work satisfactorily as warm as 80 degrees Fahrenheit. The film holder is made of materials that are not affected by the solutions, which are contained in five one-half gallon tanks, each with a trap door lid, that keeps light out and prevents splashing.

"After a piece of the film has been exposed," says Mr. Stiffler, "and the dark slide of the holder closed, the holder is removed from the camera and inserted in the first tank, which contains the developer solution. The dark slide is then withdrawn. After one minute in this tank, the dark slide is again closed and the holder transferred to the second tank, and so on until the processing is complete. The wet negative is removed from the holder and placed on the printer.

"In printing, a thin piece of clear film over the negative keeps the paper dry. It is then placed in a dry film holder. This is then put through the five tanks, just as was the original film. Final result is the finished print which is dropped to the ground, still wet, in the metal container.

"While the present equipment is still in the experimental stage," Mr. Stiffler explains, "satisfactory prints have been produced with it while in flight in seven minutes from the time of exposure of the film. Tests indicate that a satisfactory solution to the quick-work program is within sight, and it is expected that standardization and procurement for service test will be accomplished in the near future."

Science News Letter, March 8, 1941

CHEMISTRY

Wool From Soy Beans Is Used in Auto Upholstery

"WOOL" from the soy bean will shortly be adopted for automobile upholstery padding, just as plastic fiber panels will replace steel for the automobile body.

Robert Allen Boyer, head of the chemical laboratory established by Henry Ford for research with soy beans, has developed in the laboratory a soy protein fiber processed with sprayed rubber which makes a springy, durable padding.

"The soy wool is the only protein fiber thus far developed from a vegetable source. All other protein fibers come from animal protein. You are reasonably sure of a good crop in virtually all agricultural parts of the world. Two acres of land devoted to sheep grazing will produce 8 to 10 pounds of wool per year. Two acres of land in soy beans will produce 400 pounds of protein suitable for fiber," he says.

Henry Ford has a suit of clothes in which the material is 25 per cent soy bean protein fiber.

With the tensile strength of soy bean plastic now about one-half that of steel, the Ford laboratories are experimenting to develop panels made with plant fiber, held together with a soy bean resin binder, which will resist blows as well, or better, than steel. Fibers of the ramie plant, which have great tensile strength, are being added to the soy bean plastic to strengthen it.

By way of illustrating what an automobile door panel, made of plant fiber with soy bean resin binder, will stand in resisting a blow, Ford will strike a panel lying convex side up on the floor with an axe head. With the blunt side of the axe, no dent results; with the cutting edge, a clean cut results, without denting the surrounding surface. A similar blow on a steel door panel will cut through the metal, bending in the edges of the cut and making a large dent in the surrounding metal surface.

The fiber panel weighs only half that of a steel panel, of the same pattern. It is composed of 70 per cent fiber and 30 per cent resin binder. The fibrous element is compounded of 50 per cent southern slash pine fiber; 30 per cent field cereal straw; 10 per cent, cotton; and 10 per cent hemp.

Henry Ford declares the entire superstructure of an automobile body, except the tubular welded steel frame, will be made from this tough fiber plastic.

Science News Letter, March 8, 1941

PSYCHOLOGY—PHYSIOLOGY

Vitamin B Found to Protect Nerves Against Intense Noise

Londoners Living Amid Shrieking Sirens and Bursting Bombs May Be Saved from Jitters by New Enriched Bread

LONDONERS having to live day and night amid the shrieks of air-raid sirens, the scream of dropping bombs and the roar of explosions may be saved from jumpy nerves if not actual breakdown by B vitamins that their government has added to flour and bread.

The part played by this essential vitamin complex in preventing damage to the nervous system ordinarily done by intense sound is revealed in animal experiments just reported (*Journal of Comparative Psychology,* February) by Robert A. Patton, of the University of Pittsburgh.

The noise used by Mr. Patton in his experiments was a buzzer kept always at exactly the same intensity. One minute of this noise was enough to throw Mr. Patton's rats into first the jitters, then an actual convulsive fit similar to epilepsy, and coma.

This effect of intense sound in producing convulsions seems to be peculiar to rats and some other non-human animals. Just what the effect is on the human nervous system is not definitely known to science.

When the rats received only their regular chow, which contains enough vitamins for ordinary health, they suffered a total of 111 fits from 112 exposures. In another group fed a daily supplement of vitamin B_1 (thiamin), this number was cut down to 82—a 26 per cent reduction.

A combination of B vitamins, B_1, B_2, B_6 (thiamin, riboflavin, and pyridoxine) reduced the number of seizures even more—40 per cent. The possible total of 80 fits in this second experiment was reduced to 48 in the animals receiving the extra vitamin B. The group which had only ordinary diet suffered the limit possible, 80 fits.

Brewer's yeast, which contains the B vitamins, also caused a drop in the number of epileptic fits from the total possible number, 112, to 74—a reduction of 34 per cent.

On the basis of these findings, Mr. Patton suggests that the famous rats, that won for Dr. Norman R. F. Maier of the University of Michigan a $1,000 prize awarded by the American Association for the Advancement of Science by demonstrating how "nervous breakdowns" occur, may have been affected by an inadequate diet. Since Dr. Maier's much publicized research, other psychologists have brought out the fact that rats can break down in a similar way from the effects of noise alone without any conflict situation. But this breakdown from sound is not considered identical with what occurs in the nervous breakdown of human mental patients.

It is difficult to translate Mr. Patton's results into human terms. Although the dietary needs of rats bear a close relationship to those of humans, the effects on the nervous system of the intense sound is quite different.

The noise of gunfire and bursting bombs produces in most normal animals, however, a violent emotional response which looks like terror. After a long exposure to such noise, this pseudo terror may become associated with almost any sound, and the animals are "jumpy". They may then be terribly disturbed by even the slightest sound.

"If the results with experimental animals have even a reasonably close bearing upon human physiology," Mr. Patton explained, "it is clear that a new approach has been provided for the study of performance under severe conditions of noise exposure in industry and in military service of such types as the tank corps, aviation, artillery fire, and sustained bomb attacks."

It might be expected that a large number of Londoners would develop an "allergy" to noise, but Mr. Patton's research seems to indicate that the British government's action in providing for addition of vitamin B to bread will contribute greatly to protection of the precious nervous systems of those in the firing line along the home front.

The experiments also show that mental upsets may be prompted by a vitamin deficiency so slight that it could easily be overlooked in planning food for combat troops.

"Their diets are almost normal," Mr. Patton said. "The rats grow normally, and they are capable of reproduction. They look healthy.

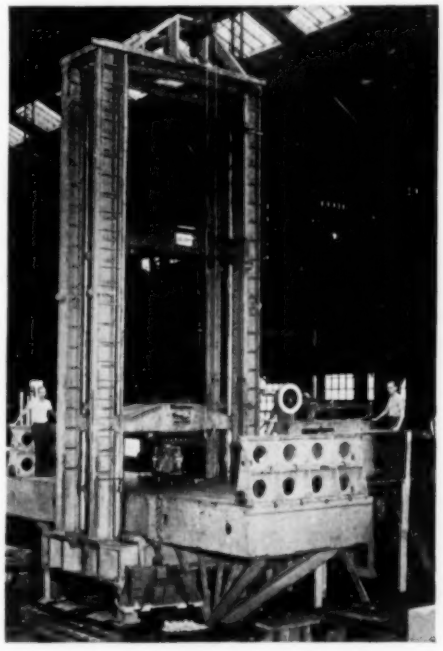
"It should also be remembered that they never become accustomed to the buzzer's noise. No matter how many times they are 'knocked cold' by it, they continue to react to it. We cannot blame this thing on surprise. It is a matter of fundamentally bad diet, and the only way to correct it is to correct the diet."

Mr. Patton's work was carried out in the psychology laboratories of the University of Pittsburgh under the direction of Dr. Harry W. Karn and Dr. Charles G. King. Financial support was provided by the Buhl Foundation of Pittsburgh.

Science News Letter, March 8, 1941

Important *tin* deposits are a reported discovery in Egypt's eastern desert.

Mechanized warfare enables 1,500 men to throw as much metal on a target now as 20,000 men could during the last war.



POWER WITH CONTROL

A new testing machine is so powerful that it can bend two parallel 12-inch steel I-beams, yet is so accurately controlled that it can crack a nut without crushing the kernel. It exerts a maximum pressure of 350 tons. It is made by the Riehle Testing Machine Division of American Machine & Metals, Inc.

POPULATION

China, of All Places, Harassed by Labor Shortage

It Is Estimated That 2,000,000 Men Have Been Killed, Another 5,000,000 in the Armed Forces; Few for Farming

CHINA with its teeming millions is harassed by a labor shortage in the topsy-turvy state of the 1941 world.

A gigantic surplus of Chinese male population, estimated at 8,000,000 before Japanese invasion, has been so used up or diverted to fighting duties that not much man power now is available for farming and industry, according to an analysis by Kurt Bloch, reported in the United States to the American Council of the Institute of Pacific Relations.

Citing oral reports which reveal the situation, strange for China, Mr. Bloch states that farmers in Szechuan did not plant a third crop in 1940 for lack of labor, although multiple cropping is the practice in wide areas of this western province.

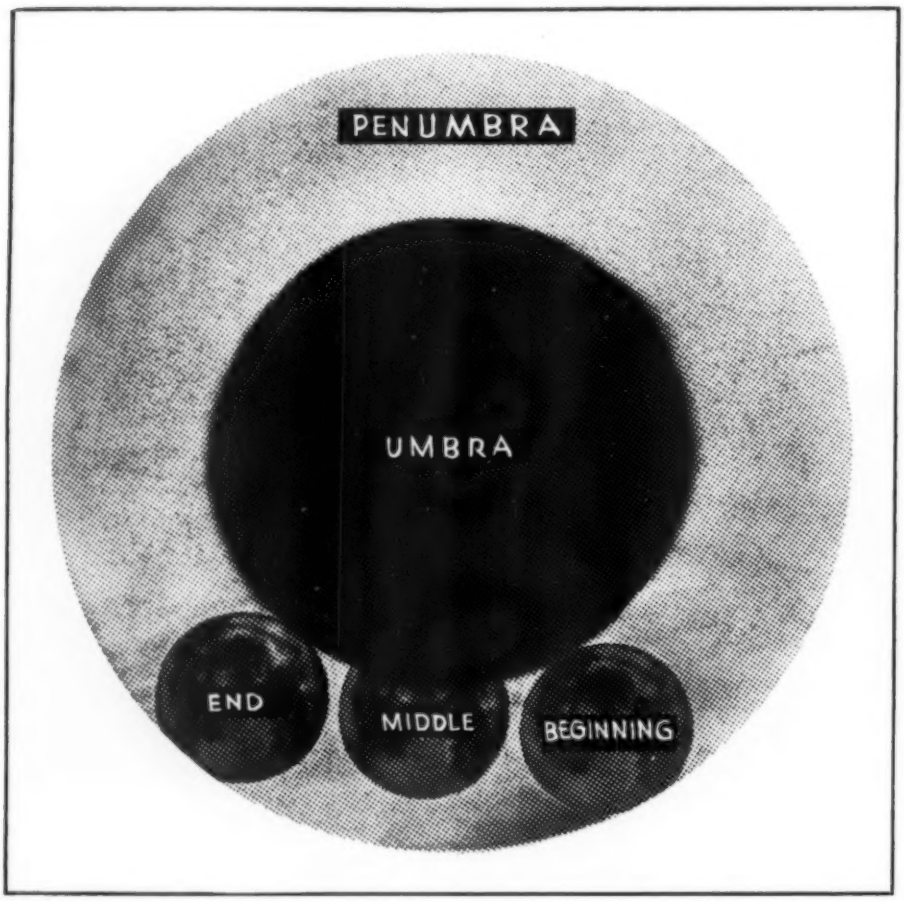
Japanese were disappointed in the size of the 1940 tobacco crop in Japanese-occupied China, another condition ascribed to scarcity of available laborers.

Reports on China's 1940 crops as a whole, which have been "none too favorable," seem to confirm these impressions, Mr. Bloch finds. He points out that a labor shortage in China's farming areas would be likely to result in a decline in the level of land rent, which Chinese farmers pay in farm products rather than money. Oral reports do point to falling rents.

Governmental organizations of free China, which are working to release occupied areas from Japan, require large totals of man power, not only to fight but to do road work, mine coal, make munitions, and work in steel mills and clothing factories.

Accounting for China's labor shortage statistically, Mr. Bloch figures that three years ago China had at least 8,000,000 men in its man-power reserves. Of these, he now concludes that possibly 2,000,000 have been killed in fighting, 5,000,000 are probably in the armed forces of the Chinese republic and in addition, hardships and illness and "punitive expeditions" by Japanese forces have taken lives of many more men than would have died in normal conditions.

Science News Letter, March 8, 1941



MOON IN EARTH'S SHADOW

Partial moon eclipse, on March 13, shown in a drawing prepared for Science Service at the Fels Planetarium of the Franklin Institute, Philadelphia. North is to the top.

ASTRONOMY

Partial Eclipse of Moon Visible on March 13

IF YOU get up early on the morning of Thursday, March 13, and the weather is clear, you will be able to see the first eclipse of the year. Then the moon will enter a little into the earth's shadow, producing a "partial lunar eclipse."

The earth's shadow has two parts. There is the umbra, the dark core, where the sunlight is completely cut off; and the penumbra, surrounding it, from which a rocket ship observer would see the earth only partly covering the sun's disk.

At 4:38 a. m., eastern standard time (for central time, one hour; mountain time, two hours, and Pacific time three hours earlier), the moon will start entering the penumbra, but not much effect will be seen. The real beginning comes at 5:55 a. m., E. S. T., when the moon's northeastern edge will begin to enter the umbra. At 6:55 a. m., the middle, the moon will be darkest.

The edge of the earth's curved shadow will then cover nearly a third of the lunar diameter. At 7:56 a. m., comes the end, when the moon will be out of the umbra. At 9:13 a. m., it will be entirely out from the penumbra as well.

Since the moon sets in Washington

at 6:21 a. m., people in the eastern part of the country will not see the last phases. In the western part of North America, however, the entire program will be visible.

Even the umbra is illuminated with light bent into it, and reddened, by passage through the earth's atmosphere, so the eclipsed part of the moon will show a characteristic coppery hue.

Science News Letter, March 8, 1941

MEDICINE

Blood Transfusion Given By Bones Instead of Veins

BLOOD transfusions can be given through the bones as well as through the veins, Dr. L. M. Tocantins and Dr. J. F. O'Neill, of Jefferson Medical College and Hospital in Philadelphia, have found.

In 17 trials of this method on 14 patients there was one failure, they report to the Society for Experimental Biology and Medicine.

Substances injected into the bone marrow enter the blood stream apparently unchanged and almost as rapidly as when injected into the veins, they report.

Bones will not supplant veins as a route for introducing blood or other substances into the bodies of patients. In some conditions, however, it is difficult or impossible to inject into the veins. Widespread mutilations, burns, dropsy, shock, and poorly developed or obliterated veins are conditions in which the bone transfusion route might prove vitally useful. In little babies the veins are usually so poorly developed that injections into them are difficult or impossible.

Blood is not the only substance that can be given through the bones as well as through the veins. Sugar solutions for patients whose blood sugar has reached dangerously low levels, blood plasma which is now being used as well as whole blood for transfusions, and salt solutions to maintain the necessary amount of fluid in the bodies of patients too sick to even drink water, may also be injected through the bones.

The blood or other substances are injected into the marrow of the bones where blood cells are formed, and presumably make their way into the blood stream as the blood cells do. The breast bone, collar one, thigh bone and shin bone were used for the injection in the cases reported by the Philadelphia scientists.

Science News Letter, March 8, 1941

WILDLIFE

Crop Surpluses Trouble Wildlife Administrators

Excess of Wild Beasts and Birds Concentrated in Spots Where Overstocking Might Ruin Range and Bring Hunger

CROP surpluses in game animals, supposed a few years ago to be on the road to extinction, are one of the most troublesome problems faced by wildlife administrators. To an American public schooled in an almost dogmatic belief that a few decades at most would see the end of all the beasts and birds that swarmed in the woods and on the plains, in the days of Daniel Boone and Buffalo Bill, the idea that there can be too many deer or beaver or elk or bear comes as a paradox. Yet what to do with these wildlife surpluses was one of the principal topics of discussion for the scientists and executives at the Sixth North American Wildlife Conference in Memphis.

Wildlife surpluses are not spread all over the map, as major agricultural crop surpluses may be. They are concentrated at certain critical spots, but where they do occur they often present more executive headaches per acre than do the problems of too much cotton or corn.

These problems vary, too, according to the jurisdiction in which they occur. State and federal governments have different kinds of wildlife trouble, and within the federal jurisdiction the problems differ in national forests, national parks, and other parts of the public domain.

The basic requirements of wildlife, to be considered in efforts to meet and solve the problem of game surplus, are just two, according to Dr. H. L. Shantz, chief of the division of wildlife management, U. S. National Forest Service: first, a place to live—the land; second, plenty of food.

In order to insure the necessary abundance of food, Dr. Shantz pointed out, the numbers of the game herds must be kept in control. This control should be by licensed hunters, and the crop should be taken regularly in such a manner as to afford the best recreational results, yield the best game animals, and leave a breeding stock of sufficient number and above all of superior quality.

Difficulty in controlling herd size and disposing of surpluses is almost always encountered, Dr. Shantz stated, because there are many persons of the most excellent intentions who have an emotional "set" that will not allow them to admit there can ever be a game surplus. Yet if the herd builds up faster than the plant life that supports it, the range is severely injured, becomes unable to keep ahead of the multitude of browsing mouths, and wholesale starvation and death may follow.

Wildlife surpluses in national parks present a different group of problems from those of national forests, Victor H. Cahalane of the U. S. Fish and Wildlife Service told the meeting. Two factors trouble the national parks administrator: Park boundaries were in the main not adjusted to take in winter as well as summer feeding grounds of their big game herds, so that supplementary feeding and other makeshift measures have been resorted to. These do not solve the problem, but merely continue it, and sometimes aggravate it.

The second severe problem of wildlife administration in national parks centers around the emotional reaction of park visitors to the animals they meet, plus the firmly established policy of permitting no hunting in the National Parks. Surpluses have to be removed in various ways that do not involve the hunting that is a proper outlet in other areas. Some of the surplus bison are butchered and the meat given to Indian tribes. Other bison, together with surplus elk and pronghorn, trouble-making bears, and certain other animals are captured alive and sent to city zoos, to state parks, to understocked forests, and even to private estates and ranches that are able to take care of them.

Science News Letter, March 8, 1941

Cork, a critical material the United States gets from Europe and Africa, could be grown in California, but it takes 15 to 20 years to produce it.

ETHNOLOGY—ART

Square Halos Shown on Saints in Medieval Art

SQUARE halos? Certainly. Medieval artists painted the halo back of a saintly head as a square, not a circle of glory, when they wanted to show perfection and holiness.

Square halos are found in paintings as early as 700 A. D. and as late as 1600, Dr. Gerhart B. Ladner of the Institute of Medieval Studies in Toronto has reported to the College Art Association, Chicago. In the fifteenth century geometrical aspects of holiness began to change, as theologians came to regard the square as less perfect than the circle, he explained. Christian saints in Christian art were then given round halos, but Old Testament personalities, supposedly less perfect because they lived before the time of Christ, continued for a time to receive square ones.

Dr. Ladner traces the first recorded use of a square as a holiness symbol to writings of Plato and Aristotle in ancient Greece. Modern praise, calling a man a "square guy," may come from the ancient Greek thought, which likened a good man to a "square without a flaw." Clement of Alexandria described a good Christian as quadrilateral or equal on all sides in his goodness.

Science News Letter, March 8, 1941

GEOLOGY

Copper Ore Bodies Gifts From Earth's Great Depths

COPPER, key metal in both war and peace, is a gift of earth's great depths. Wherever copper ore bodies are found, they are associated with cracks, fissures or other types of major breaks in the earth's crust, states Charles Henry White, San Francisco geologist. (*Economic Geology*, January-February.)

The copper-containing materials seem to have been squeezed up from the interior, more or less like toothpaste from a tube. Only, since the material was at high temperature, chemical reactions took place with the rocks nearer the surface, so that the ore bodies are not the same minerals that started from the greater depths.

Assuming for the earth an originally fluid state, like that of the sun at present, Mr. White pictures a cooling earth as forming a number of concentric layers or zones, with lighter elements toward the outside and the heavier, less active ones at greater depths. The larger part of the earth's endowment of copper, as well as most other metals, would thus be concentrated far beneath the crust.

Despite this fact, however, the copper at or near the surface reaches impressive totals. The reserves of copper in known ore bodies are estimated at about 100,000,000 tons. Copper is present, in low concentrations, throughout practically all parts of the earth's crust; the outer crust is estimated to contain an average of 0.01% copper.

"If that be true," says Mr. White, "the first mile of depth contains 200 trillion tons of the metal, or two million times as much as is known in ore bodies."

Science News Letter, March 8, 1941

ENGINEERING

Glassblower's Creation Tests Insulating Paper

See Front Cover

IN EXTREMES of temperature ranging from 300 degrees below zero Fahrenheit to 250 degrees above, paper for insulating layers in electrical condensers is tested in the glistening device shown on the front cover of this week's SCIENCE NEWS LETTER.

A glassblower in the Westinghouse Research Laboratories worked for two weeks sealing 16 tiny condensers in glass vacuum tubes strong enough to withstand the extreme temperatures which are produced by liquid air and by a burner. Electrical instruments record the efficiency of the various kinds of paper.

Science News Letter, March 8, 1941

INVENTION

Ice for Cold Drinks Made in Tubular Form

ICE for drinks and other uses is now made in tubular form, 1¾ inches in diameter. An automatic machine freezes the water into this form, and cuts it to predetermined lengths. (*Henry Vogt Machine Corp.*)

Science News Letter, March 8, 1941

INVENTION

Now Dripless Faucet Granted a Patent

A DRIPLESS faucet was patented the other day. Intended to be attached to barrels of liquid, it comprises a valve to which is attached a spout that may be raised and used as a handle for turning the faucet on and off. (*Patent 2,230,512, Imperial Brass Mfg. Co.*)

Science News Letter, March 8, 1941

IN SCIEN

GENERAL SCIENCE

Scientific Fraternity To Launch Research Fund

LAUNCHING a new research fund for women in scientific careers, Sigma Delta Epsilon, graduate women's scientific fraternity, will award $1,000 to $1,500 to a selected applicant for the coming year, the fraternity has announced.

Eligible to apply for the new fellowship are women with equivalent of a Ph.D. degree, who need financial assistance for research in mathematical, physical, or biological sciences. The recipient will be chosen on grounds of "evidence of high ability and promise," and will be required to give her entire time to the approved research project.

Applications must be submitted before March 15, 1941, and the award will be announced early in April, the fraternity award committee states. Application blanks may be obtained from Dr. Nina E. Gray, Illinois State Normal University, Normal, Illinois.

Science News Letter, March 8, 1941

PHYSICS

Two Stage Electronoscope Will Increase Magnification

THOUGH the electron microscope, which takes pictures with electrons instead of light, has already been used to make magnifications as high as 25,000 times, a new method of using it may even increase its power.

This method was described to the American Physical Society by Dr. W. V. Houston and Hugh Bradner, of the California Institute of Technology. They use the microscope in two stages.

First, electrons come from a filament similar to an electric lamp. These are focussed by an electrical lens on a thin film which is to be magnified. The electrons passing through are then focussed again by two magnetic lenses, either on a photographic plate, or a screen made of materials which glow with electron bombardment, and thus make the image visible.

Science News Letter, March 8, 1941

NE FIELDS

ENGINEERING

Derricks and Dredges Can Walk To Work

MACHINES such as dredges, pile-drivers, derricks, etc., can walk to work with the aid of a recently patented invention. They walk, at a slow speed, on two large feet that are automatically lifted and lowered. The inventor claims that the device is particularly adapted to moving heavy apparatus over rough, uneven or soft ground. (*Patent 2,230,759, Page Engineering Co.*)

Science News Letter, March 8, 1941

ORNITHOLOGY

Invade Home Life of Bird That Inspired Aviation

INVADING the private home life of the turkey vulture, two scientists have discovered how the bird world cares for infants that will some day be outstanding fliers for human aviators to study.

Scheduled feeding morning and evening is Mrs. Turkey Vulture's routine for her twins, resourceful observers of the Iowa Cooperative Wildlife Research Unit have learned by observing from blinds close to a vulture roost. A blessed event in the T. V. home is always twins.

The Fish and Wildlife Service of the U. S. Department of the Interior, which acted as one of a group of sponsors for the investigation, states that a detailed report, "Turkey Vultures in Central Iowa" has been published by the two observers, Thomas G. Scott and Robert Moorman.

That turkey vulture youngsters are not polite to strangers was revealed to the scientists when they climbed a tree to visit a nest. Irate twins inside hissed and thumped with their feet. Ignoring this tantrum, however, the scientists reported that "the birds were not difficult to handle."

The diet list of the turkey vulture household includes such items as skunks and snakes, the investigators found, examining 15 kinds of food from the gullet of a live bird.

Turkey vultures are late risers—by bird standards—seldom leaving the roost until an hour after sunrise, as the observers timed them.

Pointing out that the turkey vulture grounded seems uncouth and awkward, but is far different once it rises into the air, W. L. McAtee, technical adviser of Fish and Wildlife Service, states:

"The buzzard is not only the model but also the inspiration of the American-invented airplane."

Gliding with wind currents, these birds can soar for miles without beating wings to progress or to gain altitude.

Science News Letter, March 8, 1941

INVENTION

Masks for Surgeons Can Be Made of Paper

MASKS for surgeons, as well as for workers in dusty atmospheres, are made of paper, with a vegetable fiber that is insoluble in live steam, boiling water or common solvents. When soiled they can be washed, or discarded. (*Aldine Paper Co., N. Y. C.*)

Science News Letter, March 8, 1941

CHEMISTRY

Newest of the Vitamins Tested by Germ

A GERM related to the one that turns milk sour has given scientists a simple test for one of the newest of vitamins, pantothenic acid.

Details of the test, which can be used for determining the amount of this vitamin in foods or the abundance or lack of it in a patient, were reported by Dr. F. M. Strong, R. E. Feeney and Ann C. Earle of the University of Wisconsin College of Agriculture to the American Chemical Society.

New knowledge of human requirements of this vitamin may be obtained more quickly now that this test is available.

At present the amount of this vitamin in various foods has been estimated by feeding it to chickens. This requires several chickens and two or three weeks to test each sample of food. The lactic acid germ, however, also needs pantothenic acid and the amount it gets from any particular food can be determined within a day by determining the amount of acid the germ produces.

The new test is said to be extremely sensitive as well as simple, and its speed appears from the report that 10 to 15 samples of food can be tested, or assayed, for pantothenic acid content in a day.

Science News Letter, March 8, 1941

AGRICULTURE

Mango Is Patented Which Will Extend Season

A NEW kind of mango won plant patent 451 for Michael Fascell, of Miami, Fla. Aiming, he says, "to extend the mango season with a good quality mango which would also bear a heavy crop," he crossed two older varieties, the Haden and the Brooks Late.

Result, the patent states, was a new variety which "combines the best qualities of its parents." Mr. Fascell declares that "my aims as to extension of the season were accomplished and in addition a fruit of much superior eating qualities was produced."

Science News Letter, March 8, 1941

GENERAL SCIENCE

Democracy Best for Science Chemical Executive Says

CONTINUATION in America of fundamental research while other countries are forced by the demands of war to concentrate on applications of science assures our scientific leadership in the future, James W. Irwin, assistant to the president of the Monsanto Chemical Company, told members of the American Institute of Chemical Engineers.

History shows, he declared, that all forms of science thrive better in the climate of democracy and free enterprise. This is true, he stated, even though much scientific work is supported by private interests.

America today offers greater opportunity for fundamental scientific research than any other country, Mr. Irwin stated. "In most of our great endowed research organizations, made possible by the profits of private enterprise, and even in many of the laboratories maintained by our large corporations, there is, especially for certain gifted individuals, liberty of investigation amid the most favored surroundings. Scientists working in college and university laboratories are not obliged to kowtow to the desires of government officials. Even in our government itself, all scientific effort is not bent toward making guns, powder, and materials of war with which to achieve power or maintain it. Despite the windings of red tape, fundamental work in the control of disease, the conquest of environment, the very origins of life, goes on apace."

Science News Letter, March 8, 1941

RADIO

Natural Color Television

This Is One of the Advances Made in 14-Year Period When Television Has Continued To Be "Around Corner"

By JAMES STOKLEY

FOR FOURTEEN years, television has been "just around the corner."

Recalling this, and the over-optimistic predictions of the closing years of the twenties, anyone is rash who makes a new guess as to when the television receiver will begin to be as common a feature of the home as the sound radio set is today. However, it seems likely that, with a go-ahead signal from the Federal Communications Commission, this year will see a really extensive development of "seeing at a distance."

War developments, of course, may affect it one way or the other. On the one hand, defense needs may so fully engage the attention of the experts that they will have little time left for improving television technique. But, then, it might turn out that military uses of television would give it a real impetus.

In any event, during the years that we have been waiting for television, great advances have been made. Today it has reached an extremely high stage of realism with considerable detail to the transmitted picture, which may be shown in full color.

Birth in Funeral Parlor

I recall one April afternoon in 1927 when a small group of us gathered in a made-over funeral parlor in Washington, but to mark a birth, not a death. Most eminent of the party was Mr. Herbert Hoover, then President Coolidge's Secretary of Commerce.

As we sat in front of the transmitter, our images were carried over telephone lines and members of another group, in the Bell Laboratories in New York City, were able to see and hear us. These pictures were small, and pink in color. If you knew a person, you could recognize him, but the detail was not as good as an ordinary one column newspaper halftone picture.

Later that year, on a visit to England, I saw, in the city of Leeds, a gentleman who was sitting at the other end of a telephone wire in London. This was with the Baird process, and the results were even cruder than those of the Bell apparatus. The criterion for the success of 1927 television was ably expressed by one experimenter with whom I talked.

"If we can tell a face from a fish," he explained, "we think we're doing pretty well!"

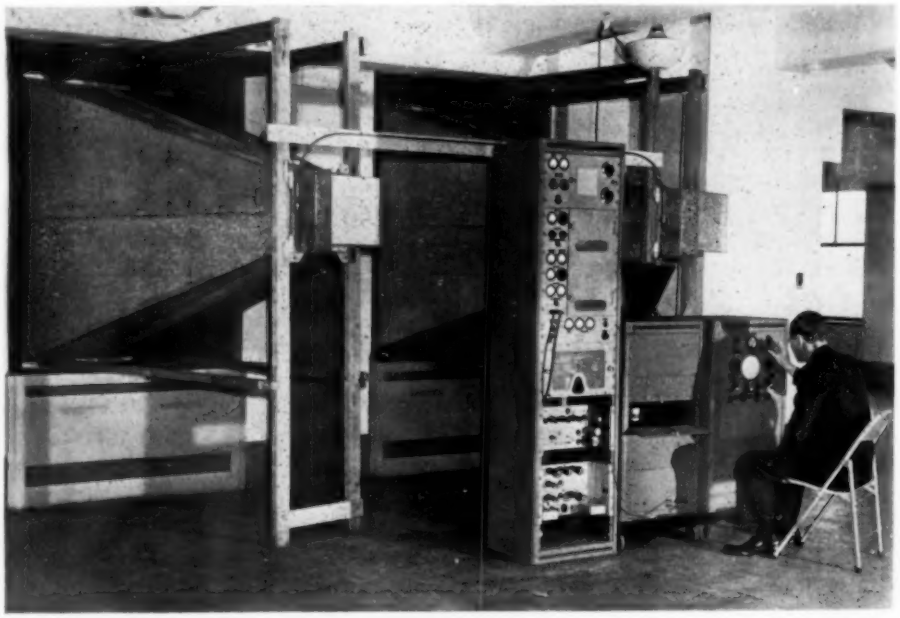
But now it is very different. The details are as clear as in most home movies. The other day a special group, including members of the F. C. C., sat in a New York theater. On a screen 15 feet high and 20 feet wide they saw reproduced scenes of soldiers marching at Camp Upton on Long Island, 68 miles away. These pictures were thrown from a special projector in the theater balcony, 60 feet from the screen.

At another demonstration, the following day, television in color was shown to the group. Living actors, and color movie films, were used as subjects. One of the latter was from a football game. Shown in black and white, the play was most difficult to follow, since one could hardly tell the teams apart. With color transmission, however, the different hues of the uniforms were easily apparent and the teams were clearly distinct, even in the most complicated tangle.

This is not the first time that color television has been accomplished. The scientists at the Bell Laboratories did it in 1929, about the same time that J. L. Baird did it in England. But their process was a complicated one. It required, in effect, three complete television systems. One transmitted the reds of the original, another the greens, and the third the blues. At the receiver each picture was formed separately, but an arrangement of mirrors recombined them, so that the looker saw them fused together.

Kinemacolor Process

The new process was worked out by engineers of the Columbia Broadcasting System under the direction of Dr. Peter C. Goldmark. In its fundamentals, it goes back to the first commercially successful method of color movies. This was the "Kinemacolor" process, by which Americans saw the colors of the coronation ceremonies of King George V, in 1910, and the Durbar at Delhi, in 1911, when he was crowned Emperor of India.



RECEIVER

Horn antennas were installed in windows of a New York skyscraper to pick up the NBC television signals from Camp Upton by way of Hauppauge and Bellmore. Similar horns were used at the relay stations.

FOR COLOR FILM

Dr. Peter C. Goldmark, chief television engineer of CBS, with the experimental transmitter used for broadcasting motion picture film in color. He has also televised living actors in color.

In the special Kinemacolor camera, the film was run through at 32 pictures per second, twice the speed then standard for black and white. (With the coming of sound films, the standard speed was increased to 24 frames per second.) Red-sensitive panchromatic film, now common, but then unusual, was employed. Revolving behind the camera lens was a color filter, half red, half green. One picture was taken in red light, the next in green, and so on.

Combine Colors Mentally

In the projector, also operating at 32 frames a second, was a similar revolving filter. The pictures taken in red light were projected with red light; and those photographed with green were shown in green. Since, on account of the persistence of vision, we continue to see an object for about a tenth of a second after it has disappeared, and since two pictures were shown every sixteenth of a second, the two separate color pictures were mentally combined into one.

Since there are three, not two, fundamental colors, with only red and green, or any other pair, it is impossible to reproduce all colors of the spectrum. Consequently, Dr. Goldmark divides his picture up into red, green and blue. A circular filter, with three such segments, revolves in the television camera, 40 times a second. Thus, in this period, there is formed successively, on the screen of the iconoscope tube that corresponds to the film in a movie camera, images in red, green and blue.

Every 120th of a second, the electron beam which controls the television transmitter sweeps over the iconoscope screen. Just as in black and white television, the currents from this screen are amplified, and modulate the radio transmitter.

The signals are received, and fed into the cathode ray viewing tube, where another electron beam, precisely in step with the one in the transmitter, sweeps to and fro over a screen which glows where it strikes. Thus, during one interval of 1/120th second, the red picture is painted, next the green and then the blue.

Color Added by Disk

As the screen glows white for all of them, no color is seen at this point until another spinning color disk, synchronized with the first, is made to revolve in front of the tube. Then the onlooker sees each picture in its proper color, and they merge together to form a complete picture, which faithfully reproduces the hues of the original. In case the receiving disk is not in step with the transmitting one, the colors are wrong, roses are green and their leaves red, for example. But pushing a button on the receiver halts the disk for an instant, and brings it into synchronism.

Fringes in Fast Action

One of the disadvantages of such a process, which was particularly marked in the Kinemacolor pictures, is what are called "color fringes." If an actor moved his hand rapidly, for instance, it would be in one place when the red picture was photographed, and a different position when the green one was taken. This would show on the screen as a blur of red and green, instead of a clearly defined hand. The faster the camera operates the less likely this is to occur. Whereas, in the Kinemacolor process, a complete picture, with both color components, required 1/16th second; the Goldmark television process completes a picture, with three colors, in 1/40th second, so it is 250 per cent faster.

Great advantage of the Goldmark method is its simplicity, for it requires no fundamental change from black and

$5.00 Down Buys
THIS FINE *Aristo*

Chronograph

DISTINCTIVE FEATURES

1. A high grade movement of tried and tested timekeeping qualities. Seventeen jewel movement cased beautifully in burnished stainless steel. Fine Pigskin Strap.
2. A stop watch of superior quality reading to 1/5th second on a clearly graduated scale, and recording up to 30 minutes on a separate register.
3. Time-Out feature essential for interrupted timing. Independent starting, stopping, and clearing action.

Indispensable for LABORATORY, SPORTS, AVIATION, and everyday use.

For the first time we offer this fine Aristo Watch on our easy payment plan and at the special price of only..... **$39.95**
Regular Retail Price.....$55.00

ARISTO IMPORT CO., INC., 630 Fifth Avenue
Dept L2 New York City

☐ Send ARISTO chronograph at special price of $39.95. I will pay $5.00 on delivery and $5.00 a month.
☐ Send ARISTO chronograph for cash price of $37.50,
☐ Check inclosed. ☐ Send C.O.D.

Name..... Age.....
Address .....
City..... State.....
Employed By .....
Address .....

IN THE THEATER

Television projector used in the RCA demonstration recently in a New York theater. The steel jacketed projector is in the foreground. The receiving tube faces a large concave mirror, which reflects the image to the screen 60 feet away.

white television. Essentially, all that is needed to convert the older system to color is the addition of the color disks in the camera and the receiver. It does not, therefore, seem too much to hope that color television will come almost as soon as television of any kind.

The great development of sound broadcasting came with the growth of the chains, for then the great expenses of producing programs could be spread over many stations. In the case of sponsored programs, an audience was provided large enough to make the advertiser willing to invest large sums. And since television is even more complicated than ordinary broadcasting the expenses for comparable programs would be even greater.

Unfortunately, inter-city telephone lines, perfectly satisfactory for sound, are entirely inadequate for acceptable sight programs. Practically all the sounds which we hear, whether from a single speaker or a symphony orchestra, consist of vibrations ranging from 50 to about 15,000 per second. It is relatively simple to devise circuits that will transmit corresponding electrical vibrations.

A single television picture is built up of some 200,000 elements, each one analogous to one of the tiny dots that make up the half-tone picture on this page. With 30 pictures per second, the standard for black and white television, there are thus 6,000,000 separate impulses to be transmitted each second, or two hundred times as many as the limit of the sound system.

By special equalizers and amplifiers, good telephone circuits can be made to carry about 3,000,000 cycles per second. This is satisfactory over short distances; within a single city, for instance. For transmission from city to city, better circuits are needed, and the coaxial cable provides the answer, though an expensive one. Each cable consists of a copper tube about the size of a lead pencil with a copper wire running through it and held in the center by disk insulators, every three-quarters of an inch. Two such cables, in a single sheath, were installed by the American Telephone and Telegraph Co. between New York and Philadelphia in 1936, partly for television, and partly for telephone purposes, since it will carry simultaneously 800 long distance conversations.

Used for Convention

This cable was used last June for the first inter-city television broadcast when people with television receivers around New York were able to watch the proceedings of the Republican National Convention in Philadelphia. The coaxial cable carried the signals between the two cities; telephone lines carried them from the Convention Hall to one end of the cable and from the other end to the N. B. C. transmitter on the Empire State Building.

A few weeks ago, members of the Institute of Radio Engineers in New York saw another demonstration of this cable. Motion pictures shown in the Bell Laboratories were sent to the meeting in the Hotel Pennsylvania over two paths. One was a direct telephone connection, the other was by the coaxial cable loop to Philadelphia and back, a path of 190 miles, the longest distance that television has yet been sent over wires. The received pictures were virtually as clear over this path as over the shorter one.

Engineers have estimated that it would cost $20,000,000 to install a coaxial cable from New York to Los Angeles, so it is unlikely that there will ever be a network like the present telephone network that connects several hundred radio stations

Solve the Problem of Visualizing . . .

FACTS FIGURES IDEAS

I am interested in free catalog of pictorial charts, maps and pictographs ☐

My special interests are:

☐ Lectures and exhibits
☐ Scientific papers
☐ Book illustration
☐ Pamphlets, posters, leaflets
☐ Promotion material
☐ Dramatized reports

Cut out entire ad, attach to your letterhead and mail to:

PICTORIAL STATISTICS • INC.
142 LEXINGTON AVENUE • NEW YORK
LExington 2-8149

Don't Delay

getting that new book you want to read. SCIENCE NEWS LETTER will gladly obtain for you any American book or magazine in print. Send check or money order covering regular retail price ($5 if price is unknown, change to be returned) and we will pay postage in the United States. When publications are free, send 10c for handling. Address:

Book Department
SCIENCE NEWS LETTER
2101 Constitution Ave. Washington, D. C.

throughout the country. Radio links may be used, perhaps entirely, perhaps in conjunction with coaxial trunk lines.

The General Electric Co., early in 1940, began to use such a link. At a receiver 1700 feet above sea level in the Helderberg Mountains near Schenectady, 129 miles from the Empire State Building, the N. B. C. television signals are received, then relayed by radio a mile and a half to the G. E. transmitter, W2XB. Half a million persons in the Albany-Schenectady area can receive these on home receivers, which would be incapable of catching the direct signals from New York.

The Radio Corporation of America has made similar developments. At the recent display of theater television, for instance, the views from Camp Upton on Long Island, 68 miles from New York, were relayed in three radio jumps. The N. B. C. mobile transmitter, contained in two large trucks, sent the signals to Hauppauge, Long Island, 17 miles away. Here they were automatically received and sent 23 miles to another station at Bellmore. This retransmitted them 28 miles more to a receiver on the 62nd floor of the R. C. A. building in New York City. Telephone wires carried them to the theater.

Engineers emphasize that in no case did the power of the intermediate stations exceed 5 watts, an accomplishment which they attribute in part to the highly directional horn antennas used. These point directly to the transmitter. From their 4 x 6 foot openings, they taper along their 8 foot length to an apex about a foot and a half square, where a small two-pole antenna is located.

With such developments, and with corresponding improvements in the home receivers that have also been made, it seems that television is now much more ready to appear around that corner than it has ever been since the pioneering days of 1927. Soon, perhaps, it will do so.

Science News Letter, March 8, 1941

● RADIO

Dr. Sanford V. Larkey, librarian of the William H. Welch Medical Library will tell how medical science is being mobilized through the National Research Council and national medical societies as guest scientist with Watson Davis, director of Science Service, on "Adventures in Science," over the coast to coast network of the Columbia Broadcasting System, Thursday, March 13, 3:45 p.m. EST, 2:45 CST, 1:45 MST, 12:45 PST. Listen in on your local station. Listen in each Thursday.

PSYCHOLOGY—PHYSIOLOGY

Spinning of Fliers May Help To Train Their Sense of Balance

Experiments With Pigeons Indicates Reduced Nystagmus Is an Aid in Keeping Equilibrium Under Difficulty

A METHOD for preliminary aviation training by spinning students in a rotating chair or pleasure park device may be developed as a result of recent experiments showing that spinning increases ability to keep one's balance.

The difficulty of flying a course parallel to the earth's surface is increased for the pilot flying at high altitudes. Objects on the earth appear small and flattened. Vision no longer gives a clear clew to up and down. The pilot who wants to keep his plane in balance or to judge the angle of his bank or climb must depend to a greater extent on his own equilibrium.

The importance of equilibrium to the airplane pilot was recognized during the World War when selection tests included spinning the recruit in a revolving chair and then measuring the length of time over which involuntary movement of the eyes persisted. If the time were unusually short, this was considered a sign of some abnormality and the applicant was rejected. Later, however, it was discovered that some of the aviators who had been active fliers had a shorter duration of this involuntary eye movement known as nystagmus than some of the rejected candidates.

Drs. G. K. Yacorzynski, Ward Halstead, and Franklin Fearing, working at Dr. Fearing's laboratory at Northwestern University, decided to explore the possibility that, instead of being a handicap, reduced nystagmus might actually aid the pilot in maintaining his equilibrium. It has been previously noticed that toe dancers who whirl about in dances that would make the ordinary individual sick with dizziness are able to maintain their balance perfectly. They show a reduced nystagmus. This is also the case with figure skaters.

Their laboratory test was made on pigeons, the ear labyrinth of these birds being similar to that of man. One group of 24 birds had their nystagmus reduced by rotation on a turntable. Another group of 24 did not.

Then the birds were tested for ability to keep their balance on a rotating perch. Results of the experiment are published in the *Journal of Psychology*. (January)

The birds who had been spun to reduce their nystagmus were superior in keeping their balance.

The investigators suggest that perhaps it is not the reduced eye movement itself that improves the equilibrium. Perhaps it is a reduction of other effects such as nausea, dizziness, and a sense of falling that commonly accompany nystagmus. These reactions, if they came when the bird (or the aviator) was trying to balance himself, would disrupt his ability to hold to his position.

Should these results be shown to be true for human beings, it might prove advisable to reduce the nystagmus of the prospective flier before he takes to the air. The feeling of dizziness which accompanies rapid movements of the body in space, such as, for example, when the airplane banks, would then be absent. The functional use of the labyrinth would be intact, but the secondary sensations which disrupt equilibrium would not be present.

It would be possible to duplicate the plane's maneuvers in a ground instrument that would give the student the "feel" of flying.

Science News Letter, March 8, 1941

INTERESTED? in Science

PURPLE - X Ultra - Violet lamp—a powerful source of U.V. (250 watts, 50 hours, 110 volts, ordinary socket). Minerals, dyes, vaseline, natural teeth shine in its rays. Fun on a party, see who has false teeth or paint skull on face with vaseline. Useful to teachers. $2.00, express chgs. collect.

ALNICO most powerful magnet known —the new super-powerful alloy of Aluminum, Nickel, Cobalt developed by G.E. Will be a source of continual interest on your office desk Lowest prices, C-102 1¼" high, $1.00 each, $1.50 per pair. C-103 1¾" high, $1.50 each, $2.25 per pair (best Buy).

FREE

FREE BRYOPHYLLUM — a remarkable house plant. Lay on soil and new plants sprout from each notch. Sent free with a year's subscription to QUEST Science Summary, the beautiful new illustrated monthly magazine of Science and All Garden Experiments. Subscription $2.00, sample 25c.

ALSO FREE — powerful C - 102 ALNICO Super-Magnet for prompt remittance.

QUEST Publishing B-11, Wellesley, Mass.

FORESTRY

NATURE RAMBLINGS
by Frank Thone

Discovery Forest

A RESOLUTION calling for the establishment of a national forest to commemorate the four hundredth anniversary of the discovery of the Mississippi river by De Soto, in 1541, was presented at the recent meeting of the Sixth North American Wildlife Conference, at Memphis, Tenn., by Edward J. Meeman, editor of the Memphis *Press-Scimitar*. It was unanimously adopted by the Conference, and the proposal will be recommended to the proper authorities in Washington.

A good deal of latitude can be permitted in locating this forest, for the valiant Spanish explorer covered much territory in his long and toilsome journey across what is now the southern United States. His exact track will probably never be known, nor the precise spot where he stood when he first beheld America's mightiest river. This is, in a way, an advantage, for it will be possible for the forest to be located anywhere in the general area through which his route is known to have passed. Probably most people would prefer to have it touch the banks of the Mississippi at some point—perhaps even to lie on both banks of the river if possible.

A unique feature of Mr. Meeman's proposal is the provision for including in the Discovery Forest a specially designated Grove of Repentance, as a perpetual acknowledgment by Americans of the present generation of the sins they and their forebears have committed against nature, in over-exploiting and ruining so much of the vast treasure of natural resources that existed in the great central valley of this continent when white men first penetrated into it. This grove would be a restoration to primeval conditions, as nearly as this is possible now, and it would stand untouched, to be visited only by scientists and the rangers having charge over it.

Carrying out the entire project need not be undertaken at once. Mr. Meeman suggests, because of the present national emergency. However, he feels that it should be possible for national and state authorities to take the necessary preliminary action, to survey the appropriate site or sites, to make "token" plantings, and to hold formal dedicatory exercises in this, the quadricentennial year.

Science News Letter, March 8, 1941

PHYSICS—RADIO

Clouds of Material Bullets From Sun Affect Earth Radio

CLOUDS of bullets which are continually shot from the sun make it possible for radio waves to travel long distances by night as well as by day.

Recent studies by the staff of the Department of Terrestrial Magnetism of the Carnegie Institution of Washington have revealed new facts about these material particles which cause the aurora borealis and are mainly studied by their effect on the magnetic condition of the earth.

These particles travel across the 92,900,000 miles separating sun and earth much more slowly than the visible and invisible light waves, which make the trip in about eight minutes. That is why they produce an effect at night.

Invisible ultraviolet waves, similar to light, strike atoms in the uppermost parts of our atmosphere, ionize them by knocking electrons from them. This makes an electrical ceiling that prevents radio waves from escaping into space, reflecting them downwards instead, perhaps many times, and thus sending them around the curved globe.

This effect is only in the daytime hemisphere—that which faces the sun, yet the radio ceiling persists into the night. But the particles being slower, even the night time part of the earth is constantly running into them, and the effect, in ionizing the upper atmosphere, is similar to that of the light waves.

The bombardment is described, in a statement issued by the Carnegie Institution of Washington, as "coming in clouds of particles, of various sizes from mere wisps to diameters many times the earth's radius, which form a more or less continuous stream, perhaps of the structure of a string of pearls and in shape like the arms of a spiral nebula."

This "P-radiation," as the stream of bullets is called, is presumed to come from hypothetical "M-regions" of great activity on the sun's surface.

Science News Letter, March 8, 1941

ENGINEERING

Uses Airplane Principles In Camera Platform

USING engineering principles of the modern airplane fuselage, a new camera platform or "boom" is being used by the M-G-M Studios. Measuring nine feet long, and weighing 3,100 pounds instead of 7,600 pounds which a usual boom of this size would weigh, the camera can be laid on the floor, or raised to a height of 16 feet. So well is it balanced that it can be raised or lowered with one finger.

Science News Letter, March 8, 1941

Science News Letter Subscription Coupon

To Science News Letter, 2101 Constitution Avenue, Washington, D. C.

☐ Start ☐ Renew my subscription to SCIENCE NEWS LETTER for ☐ 1 year, $5 ☐ 2 years, $7

Name_____

Street Address_____

City and State_____

(No extra postage to anywhere in the world)

•First Glances at New Books

Additional Reviews On Page 160

ENGINEERING

MODEL GASOLINE ENGINES, Their Operation and Use—Raymond F. Yates—*Appleton-Century*, 241 p., illus., $2.50. No longer are builders of model airplanes, boats, etc., limited to spring motors, rubber bands and the like to power their craft, for recent years have seen the introduction of highly reliable and efficient little gasoline engines. This, said to be the first book entirely devoted to the subject, will be of great interest to all model builders, or others wanting information about tiny power plants.

Science News Letter, March 8, 1941

ICHTHYOLOGY—JUVENILE

SALMON—Pennsylvania Work Projects Admin.—*Albert Whitman*, 48 p., illus., 50c. A highly informative little book about a highly important food fish, designed for pupils in the lower grades.

Science News Letter, March 8, 1941

HISTORY

STORY OF CIVILIZATION — Carl L. Becker and Frederic Duncalf — *Silver Burdett*, 881 p., illus., maps, $2.40. Approximately half of this up-to-date text reviews the ancient and medieval past. The latter half takes up modern civilization, analyzing the political and social revolution which has occurred, and the industrial revolution.

Science News Letter, March 8, 1941

PALEOBOTANY

SOME FOSSIL PLANT TYPES OF ILLINOIS — Raymond E. Janssen — *Illinois State Museum*, 124 p., 28 pl., $1.25. A monograph of the Lesquereux types in the Illinois State Museum, together with new material from the Mazon Creek deposits. Descriptions are careful and accurate, and the photographic plates are extremely good. This publication initiates a new series by the Illinois State Museum; if subsequent numbers maintain the standard set by this first one, it will be a credit to the sponsoring institution.

Science News Letter, March 8, 1941

BOTANY—MEDICINE

PLANTS USED AS CURATIVES BY CERTAIN SOUTHEASTERN TRIBES — Lyda Averill Taylor—*Botanical Museum of Harvard Univ.*, 88 p., $2. A study in ethnobotany that will interest the physician and pharmacologist no less than the botanist and ethnologist. The plants are arranged according to botanical families, and with each listing is given a description of the Indians' preparation and uses of the plant, together with actual medicinal value, if any. The proportion of plants really useful in medicine is surprisingly high.

Science News Letter, March 8, 1941

GENERAL SCIENCE

ANNUAL REPORT OF THE SECRETARY OF THE INTERIOR FOR THE FISCAL YEAR ENDING JUNE 30, 1940—U. S. Dept. of Interior—*Govt. Print. Off.*, 528 p., illus., 75c.

Science News Letter, March 8, 1941

AGRICULTURE—ECONOMICS

DEMOCRACY COMES TO A COTTON KINGDOM, The Story of Mexico's La Laguna —Clarence Senior—*Distributed in U. S. by: League for Industrial Democracy, New York, N. Y.*, 56 p., 15c. Account of a cooperative cotton-farming project in Mexico.

Science News Letter, March 8, 1941

ENGINEERING—CHEMISTRY

THE APPLICATIONS OF CHEMICAL ENGINEERING—Harry McCormack, ed.—*Van Nostrand*, 431 p., $3.75. A chemical engineer has to put into practice many principles of physics as well as of chemistry. This book, the cooperative effort of twelve chemical engineering professors, is a laboratory manual to train the embryo Ch. E. in these applications. They include measurements of temperature, flow of liquids, distillation, drying, etc.

Science News Letter, March 8, 1941

MATHEMATICS

COLLEGE ALGEBRA—Harold T. Davis—*Prentice-Hall*, 423 p., $2.50. Dr. Davis has made this new text-book particularly interesting by many references to historical incidents connected with the matters treated, and to their present applications. Of particular value is the chapter on statistics, which constitutes an excellent introduction to this subject. Also of note is the chapter on mathematical recreations, covering such perennially misunderstood things as the trisection of the angle and the squaring of the circle.

Science News Letter, March 8, 1941

BOTANY

LIST OF SHRUBS EXCLUSIVE OF CONIFERS GROWING OUTDOORS IN THE BROOKLYN BOTANIC GARDEN, 1940—Charles F. Doney,—*Brooklyn Botanic Garden*, 35 p., illus., 25 c.

Science News Letter, March 8, 1941

MATHEMATICS

RAMANUJAN, Twelve Lectures on Subjects Suggested by His Life and Work—G. H. Hardy—*Cambridge (Macmillan)*, 236 p., $6. Srinivasa Ramanujan was the Indian genius who, despite a somewhat deficient education, was one of the world's great mathematicians when he died at the age of 33 in 1920. In the first of these essays, Dr. Hardy, who probably knew him best, gives a general account of his career. The others are devoted to various mathematical subjects with which he was connected.

Science News Letter, March 8, 1941

NUTRITION

FOODS AND NUTRITION—Fern Silver—*Appleton-Century*, 522 p., illus., $1.72. A text for high school students which covers nutrition, cooking, food purchasing, meal serving and planning, and even has a section on camp cookery and on ordering foods in dining cars and restaurants.

Science News Letter, March 8, 1941

CHILD STUDY

AN ADOPTED CHILD LOOKS AT ADOPTION—Carol S. Prentice—*Appleton-Century*, 222 p., $2. At this time when so many children are temporarily or permanently separated from their parents, this book written sympathetically by one who has been both adopted child and adopted mother, should be very useful.

Science News Letter, March 8, 1941

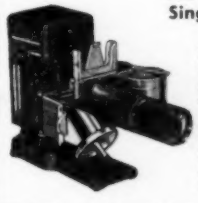
CRIMINOLOGY

FINGERPRINTING, A MANUAL OF IDENTIFICATION—Charles Edward Chapel—*Coward McCann, Inc.*, 299 p., illus., $3.75. A book intended for the layman on the details of making and classifying fingerprints. The author is a retired officer of the U. S. Marine Corps.

Science News Letter, March 8, 1941

S.V.E. PROJECTORS

Offer the Widest Choice In Styles and Sizes



For Showing 2″ x 2″ Slides Single and Double Frame Filmstrips.

From 100 to 300 watts, they include models for slides only, as well as the versatile Tri-Purpose models, that show all three—2″ x 2″ slides, single frame filmstrips, double frame filmstrips. Write for free literature.

SOCIETY FOR VISUAL EDUCATION, INC.
Dept. 3-SNL, 100 E. Ohio St., Chicago, Ill.

•First Glances at New Books

Additional Reviews On Page 159

HISTORY

NARRATIVES OF THE CORONADO EXPEDITION, 1540-1542—George P. Hammond and Agapito Rey—*Univ. of New Mexico Press*, 413 p., $3.50. The second of 11 volumes of the Coronado Historical Series authorized by the Coronado Cuarto Centennial Commission, to encourage preservation of our historical literature. Prefaced by a helpful resume of Coronado's career, the 30 original documents in this volume provide a vivid picture of an expedition of that time. Especially interesting are the trial records and other documents relating to the "investigation" of Coronado on charges of mismanagement, presenting new material found in archives of Spain.

Science News Letter, March 8, 1941

BIOLOGY

BIOLOGY — Howard M. Parshley — *Wiley*, 232 p., illus., $2.25. A compact, well-written text for college survey courses, notable alike for judgment in selection of what to leave out and for brief adequacy in treatment of what is included.

Science News Letter, March 8, 1941

HORTICULTURE

GROWING TREE AND SMALL FRUITS (2d ed.)—H. B. Knapp and E. C. Auchter—*Wiley*, 615 p., $2.75. New edition of a highly practical text for courses in vocational agriculture.

Science News Letter, March 8, 1941

BOTANY

STUDIES OF THE VEGETATION OF MISSOURI—I, Natural Plant Associations and Succession in the Ozarks of Missouri—Julian A. Steyermark—*Field Museum of Natural History*, 124 p., illus., $1.

Science News Letter, March 8, 1941

ENTOMOLOGY

A REVISION OF THE NEARCTIC HEMEROBIIDAE, BEROTHIDAE, SISYRIDAE, POLYSTOECHOTIDAE AND DILARIDAE (NEUROPTERA) — F. M. Carpenter — *American Academy of Arts and Sciences*, 87 p., illus., $2.25.

Science News Letter, March 8, 1941

TECHNOLOGY

ELEMENTS OF THE PETROLEUM INDUSTRY—E. DeGolyer, ed.—*American Institute of Mining and Metallurgical Engineers*, 519 p., $5. Each of the twenty-one chapters is written by an expert in his field. The names of the authors of this book, and the auspices under which it is issued fully attest its authority. It is a complete and elementary compendium of the industry in all its phases. Not only are the engineering points covered, but also there are chapters devoted to land tenure and leasing, the economics of the petroleum industry and an introduction to the literature of oil and gas.

Science News Letter, March 8, 1941

ASTRONOMY

PRIMER OF CELESTIAL NAVIGATION — John Favill—*Cornell Maritime Press*, 223 p., illus., $2.50. This is a practical manual, intended, as the author explains, for "those who enjoy understanding why things are done and what they mean, and who like to have all important steps included."

Science News Letter, March 8, 1941

TRAVEL

LAND OF THE EYE—Hassoldt Davis—*Holt*, 415 p., illus., $3. Adventures of the motion-picture expedition, led by Armand Denis and Leila Roosevelt Denis, told by a member of the party who writes with dramatic insight and a zest for vigorous story telling. The route is from Rangoon over the Burma road into China, and back, then to the main goal, Nepal, little-known Indian kingdom near the Tibet border.

Science News Letter, March 8, 1941

GENERAL SCIENCE

CATHOLICISM AND THE PROGRESS OF SCIENCE—William M. Agar—*Macmillan*, 109 p., $1. A brief exposition by one of the lay leaders of present-day Catholic popular apologetics. It should do much toward clearing up long-standing misconceptions, some of which are accepted even by Catholics themselves.

Science News Letter, March 8, 1941

ECONOMICS

I BELIEVE IN AMERICA: AN AMERICAN MANIFESTO—Ray W. Sherman— *Oskar Piest*, 180 p., $1.50. The son of a country blacksmith and a "self-made man" expresses his creed and the belief that "America is going to see prosperity such as no country in the world has ever known."

Science News Letter, March 8, 1941

ZOOLOGY

NOTES ON MEXICAN SNAKES OF THE GENUS GEOPHIS—Hobart M. Smith—*Smithsonian Inst.*, 6 p., 10c.

Science News Letter, March 8, 1941

PSYCHOLOGY—BIOGRAPHY

FROM THIRTY YEARS WITH FREUD—Theodor Reik; Trans. by Richard Winston—*Farrar & Rinehart*, 241 p., $2.50. This biography of a great scientist is something more than that. It seems to turn the keen light of Freud's mind onto the tremendous world problems that have survived him. In increasing understanding of the character of the famous psychoanalyst, the book aids in producing an understanding of the world in which he lived and died.

Science News Letter, March 8, 1941

CONSERVATION

MY COUNTRY 'TIS OF THEE, The Use and Abuse of Natural Resources—Lucy Sprague Mitchell, Eleanor Bowman and Mary Phelps—*Macmillan*, 335 p., illus., $3.50. Strikingly phrased text, supported by vividly executed diagrams and equally striking photographic illustrations, give this book a decided bite. It isn't a mere dispassionate presentation of conservation facts; the authors have an evangel, and they don't hesitate to invoke a certain amount of emotion in driving it home. Should be required reading for Pippas of all ages and social positions.

Science News Letter, March 8, 1941

ARCHAEOLOGY

YALE CLASSICAL STUDIES, Vol. 7—Austin M. Harmon, Alfred R. Bellinger, Henry T. Rowell and Robert O. Fink, eds.—*Yale Univ.*, 317 p., $3. Analyzes an important fragmentary papyrus found at Dura in archives of the Roman garrison. The document, an official list of military festivals, was used within the period 224-235 A.D. and is the only surviving official religious document of Rome in calendar form within three centuries.

Science News Letter, March 8, 1941

EDUCATION

MATERIAL FACILITIES NEEDED IN THE TRAINING OF INTERMEDIATE GRADE TEACHERS IN SCIENCE—Harry Allen Cunningham—*Teachers College, Columbia Univ.*, 162 p., illus., $2.

Science News Letter, March 8, 1941

PHYSICS

PHYSICAL SCIENCE IN ART AND INDUSTRY —E. G. Richardson—*Macmillan*, 293 p., $3.50. A useful book from England which gives physicists and others some idea of what physics has been doing in recent years for industry and the fine arts.

Science News Letter, March 8, 1941